REMARKS

I Summary of the Amendments

The present patent application still comprises fifty (50) claims, numbered 1 to 30, 35, 38 to 41, 50 to 55 and 59 to 67.

Claims 1 and 65 have been amended. Claims 31 to 34, 36, 37, 42 to 49 and 56 to 58 have been previously cancelled.

Support for amendments made can be found throughout the specification and drawings as originally filed. No new matter has been added to the present patent application by the present amendment.

II Rejection of Claims 1 to 30, 35, 50 to 55 and 59 to 67 under 35 USC 103

On pages 2 to 31 of the Final Office Action, the Examiner rejected claims 1 to 30, 35, 50 to 55 and 59 to 67 under 35 USC 103(a) as being unpatentable over U.S. Patent No. 6,577,634 to Tsukakoshi *et al.* (hereinafter referred to as "Tsukakoshi") in view of U.S. Patent No. 6,947,963 to Agarwal *et al.* (hereinafter referred to as "Agarwal").

As described below, the Applicants respectfully submit that claims 1 to 30, 35, 50 to 55 and 59 to 67, as amended, are in condition for allowance.

Independent claims 1, 23 and 65

Excerpts of claims 1, 23 and 65 are presented below, with certain elements being emphasized:

> 1. A router supporting multiple routing protocols, said router comprising:
> [...]
> c. a routing layer in communication with said interface layer, said routing layer including a plurality of routing protocol computing entities, each routing

protocol computing entity being associated with a set of at least one routing protocol and including:

i. a CPU; and

ii. a data storage medium in communication with said CPU and storing program data for execution by said CPU to cause said routing protocol computing entity to effect management of one or more peering sessions with remote routing devices according to the at least one routing protocol in the set associated with said routing protocol computing entity, said management of one or more peering sessions comprising maintaining in said data storage medium one or more route databases including routing data;

wherein the set of at least one routing protocol associated with a first one of said routing protocol computing entities is different from the set of at least one routing protocol associated with a second one of said routing protocol computing entities;

wherein the one or more route databases maintained in the data storage medium of said first one of said routing protocol computing entities contain information on at least one route for which there is no information in the one or more route databases maintained in the data storage medium of said second one of said routing protocol computing entities;

[...]

23. A router, comprising:

[...]

c. a routing layer in communication with said interface layer, said routing layer including a plurality of routing protocol computing entities, each routing protocol computing entity being associated with a routing protocol and including:

i. a CPU; and

ii. a data storage medium in communication with said CPU and storing program data for execution by said CPU to cause said routing protocol computing entity to effect management of one or more peering sessions with remote routing devices according to the routing protocol associated with said routing protocol computing entity, said management of one or more peering sessions comprising maintaining in said data storage medium one or more route databases;

wherein the routing protocol associated with a first one of said routing protocol computing entities is the same as the routing protocol associated with a second one of said routing protocol computing entities;

wherein the one or more route databases maintained in the data storage medium of said first one of said routing protocol computing entities contain information on at least one route for which there is no information in the one or more route databases maintained in the data storage medium of said second one of said routing protocol computing entities.

65. A router supporting multiple routing protocols, said router comprising:

[...]

c. a routing layer in communication with said interface layer, said routing layer including a plurality of routing protocol computing entities, each routing protocol computing entity being associated with a set of at least one routing protocol and including:

i. a CPU; and

ii. a data storage medium in communication with said CPU and storing program data for execution by said CPU to cause said routing protocol computing entity to effect management of one or more peering sessions with remote routing devices according to the at least one routing protocol in the set associated with said routing protocol computing entity, said management of one or more peering sessions comprising maintaining in said data storage medium one or more route databases including routing data;

wherein the set of at least one routing protocol associated with a first one of said routing protocol computing entities is different from the set of at least one routing protocol associated with a second one of said routing protocol computing entities;

wherein the one or more route databases maintained in the data storage medium of said first one of said routing protocol computing entities contain information on <u>at least one route for which there is no information</u> in the one or more route databases maintained in the data storage medium of said second one of said routing protocol computing entities;

[...]

The Applicants respectfully submit that Tsukakoshi and Agarwal, whether taken separately or in combination, do not teach or suggest a router as claimed in each of claims 1, 23 and 65, and, in particular, do not teach or suggest the above-emphasized elements of these claims.

Specifically, neither Tsukakoshi nor Agarwal teaches or suggests a plurality of routing protocol computing entities each associated with a routing protocol and each including a CPU and a data storage medium, where the one or more route databases maintained in the data storage medium of a first routing protocol computing entity contain information on <u>at least one route for which there is no information</u> in the one or more route databases maintained in the data storage medium of a second routing protocol computing entity.

As conceded by the Examiner on page 9 of the Final Office Action in connection with claim 23, Tsukakoshi neither teaches nor suggests this element, which is now claimed in each of claims 1, 23 and 65[1].

To address this deficiency of Tsukakoshi, the Examiner applies Agarwal and contends that it discloses the claimed element missing from Tsukakoshi. In an attempt to support this contention, the Examiner refers to Figure 2 and column 8, lines 1 to 15 as well as Figure 3 of Agarwal and states that "for instance Route Data B is not contained in Control Card L1A/RPA".

With respect, the Examiner's contention is incorrect as Agarwal fails to disclose or suggest the above-emphasized claim element, which the Examiner already conceded is absent from Tsukakoshi.

Specifically, Agarwal describes a router including control cards with processors, where each processor runs zero or more routing protocols of a complement of routing protocols and receives a full complement of routing data generated by the complement of routing protocols (column 3, line 61 to column 4, line 7; and column 4, lines 49 to 60). This is ample clear from Agarwal as a whole and in fact from the very passage referred to by the Examiner where Agarwal, in describing Figure 2, states that "the L1 [processor] for each control card *requires route data from the full complement of routing protocols*" (emphasis added – column 8, lines 10 to 13). Not only does this not support the Examiner's contention regarding what Agarwal allegedly discloses, but this totally contradicts the Examiner's contention.

More specifically, a central and essential aspect of Agarwal's router is that the routing database maintained by each processor is synchronized to contain route data from the full

[1] Indeed, as shown on pages 26 and 27 of the response filed on September 13, 2006, Tsukakoshi's clustered router 11 is designed to ensure that all of its route calculation units 20 have the same routing information in their memory 42. In other words, there is *duplication* of network information 16 across all the route calculation units 20. This entails that the routing information stored in the memory 42 in all of Tsukakoshi's route calculation units 20 contain information on identical sets of routes. Therefore, as conceded by the Examiner, Tsukakoshi fails to teach or suggest the claimed feature whereby the one or more route databases maintained in the data storage medium of a first routing protocol computing entity contain information on at least one route for which there is no information in the one or more route databases maintained in the data storage medium of a second routing protocol computing entity.

complement of routing protocols running on all processors (column 2, lines 46 to 49; column 3, lines 11 to 14, 19, 20 and 28 to 31; column 4, lines 3 to 7, 55 to 60; column 7, lines 23 to 35; and column 8, line 66 to column 9, line 3). This entails that the routing databases in all of Agarwal's control cards contain information on identical sets of routes. Therefore, Agarwal clearly fails to teach or suggest the claimed scenario where the one or more route databases maintained in the data storage medium of a first routing protocol computing entity contain information on at least one route for which there is no information in the one or more route databases maintained in the data storage medium of a second routing protocol computing entity.

Regarding the Examiner's reference to Figure 3 of Agarwal, the Examiner will note that, while Figure 3 does not show arrows indicating transfer of Route Data B from either L1B/RPB or L1B'/RPB (acting as servers in Agarwal's terminology) to L1A'/RPA (acting as a client in Agarwal's terminology), Agarwal's description of this figure states that an L1 processor "may have both client and server functionality concurrently" and that, "*[f]or the sake of clarity*, L1A' and L1B are not *shown* as clients, but as servers only" (emphasis added – column 8, lines 33 to 35). In other words, Agarwal's Figure 3 does not show transfer of route data between all L1 processors shown in that figure simply to facilitate description of part of the functionality of these processors. This drawing simplification in no way changes the fact that a central and essential aspect of Agarwal's router is that the routing database maintained by each processor is synchronized to contain route data from the full complement of routing protocols running on all processors, and thus that the routing databases in all of Agarwal's control cards contain information on identical sets of routes.

Accordingly, Agarwal (like Tsukakoshi) fails to teach or suggest a plurality of routing protocol computing entities each associated with a routing protocol and each including a CPU and a data storage medium, where the one or more route databases maintained in the data storage medium of a first routing protocol computing entity contain information on at least one route for which there is no information in the one or more route databases maintained in the data storage medium of a second routing protocol computing entity.

In light of the above, it is respectfully submitted that at least one element of each of claims 1, 23 and 65, is neither taught nor suggested by Tsukakoshi and Agarwal, whether taken separately or in combination. Therefore, the Applicants respectfully submit that at least one criterion required for establishing a *prima facie* case of obviousness in accordance with MPEP 706.02(j)[2] is not satisfied. The Examiner is thus respectfully requested to withdraw the rejection of claims 1, 23 and 65, which are believed to be in condition for allowance.

Dependent claims 2 to 22, 24 to 30, 50 to 55, 59 to 64, 66 and 67

Each of claims 2 to 22, 24 to 30, 50 to 55, 59 to 64, 66 and 67 depends on one of claims 1, 23 and 65 and thus incorporates by reference all the elements of that base claim. Hence, for the same reasons as those set forth above in respect of claims 1, 23 and 65, the Applicants respectfully submit that claims 2 to 22, 24 to 30, 50 to 55, 59 to 64, 66 and 67 are in condition for allowance and respectfully request the Examiner to withdraw the rejections of these claims.

Independent claim 35

Claim 35 is reproduced below with certain elements being emphasized:

> A router, comprising:
> a. **an interface layer including a plurality of I/O controllers**, each I/O controller implementing an I/O port;
> b. a switching layer in communication with said interface layer for selectively establishing signal pathways between said I/O ports;
> c. a routing layer in communication with said interface layer, said routing layer comprising a routing protocol computing entity capable of managing **at least one peering session with a remote routing device**, the peering session including the exchange of messages with the remote routing device through one of the I/O controllers, the peering session being comprised of a plurality of tasks;
> d. **the one I/O controller implementing a peering session assist module,**

[2] For the Examiner to establish a *prima facie* case of obviousness, three criteria must be considered: (1) there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings, (2) there must be a reasonable expectation of success, and (3) the prior art references must teach or suggest all of the claim limitations. MPEP §§ 706.02(j), 2142 (8th ed.).

e. **said peering session assist module being capable of performing some of the tasks of the peering session autonomously from said routing protocol computing entity** of said routing layer;

f. said routing layer being capable of performing tasks of the peering session other than the tasks performed by the peering session assist module;

wherein the tasks performed by the peering session assist module autonomously from said routing protocol computing entity include **authenticating, without intervention of said routing protocol computing entity, messages received from the remote routing device.**

The Applicants respectfully submit that Tsukakoshi and Agarwal, whether taken separately or in combination, do not teach or suggest the above-emphasized elements of claim 35.

Specifically, neither Tsukakoshi nor Agarwal teaches or suggests an I/O controller of an interface layer of a router that implements a **peering** session assist module capable of authenticating, without intervention of a routing protocol computing entity of a routing layer of the router, messages received from a remote routing device during a **peering** session between the router and the remote routing device.

As conceded by the Examiner on page 29 of the Final Office Action, Tsukakoshi does not teach or suggest these elements of claim 35.

To address this deficiency of Tsukakoshi, the Examiner applies Agarwal and contends that: (1) Agarwal discloses a peering session assist module constituted by Agarwal's Route Table Manager and residing both on Agarwal's Line Cards and Control Cards; (2) "autonomous peering sessions are readily established [...] between Controller cards and [...] between Line Cards"; and (3) "at the I/O level which is at the Line card registration and authentication of registered members occurs independent of the routing layer". In an attempt to support this contention, the Examiner refers to Agarwal's Figures 1 and 4 and column 6, lines 10 to 30; Figures 3 and 6 and column 4, lines 14 to 30; and Figure 6 and column 10, lines 20 to 35.

With respect, the Examiner's contention is incorrect as Agarwal fails to disclose or suggest the above-emphasized elements of claim 35, which the Examiner already conceded are absent from Tsukakoshi.

To begin with, the Examiner should be aware that "peering" has a well-established meaning in the art and refers to communication of route information between routers through routing protocols. In fact, as mentioned on page 7, lines 6 to 8 of the present application as originally filed, "peering session" is used in a broad sense with the intent to encompass the communication of route information from one router to another router, irrespective of the routing protocol used. Furthermore, claim 35 itself refers to a peering session with a remote routing device, the peering session including the exchange of messages with the remote routing device through one of the I/O controllers of the claimed router. It should thus be clear to the Examiner that "peering" refers to communication of route information between routers.

Now, the interaction between Agarwal's control cards and between Agarwal's line cards referred to by the Examiner relates to establishing communication between entities **within** Agarwal's router as client-server relationships. This is clearly not "peering" as it is not communication of route information between routers. On that basis alone, it is ample clear that the Examiner's contention is incorrect as the passages of Agarwal referred to by the Examiner do not at all relate to "peering".

Since the passages of Agarwal referred to by the Examiner do not relate to "peering" in the first place, it goes without saying that they cannot possibly teach or suggest authentication of messages received from a remote router during a peering session[3].

Accordingly, Agarwal (like Tsukakoshi) fails to teach or suggest an I/O controller of an interface layer of a router that implements a **peering** session assist module capable of authenticating, without intervention of a routing protocol computing entity of a routing layer

[3] Notwithstanding this, the Examiner will note that these passages do not relate to authentication. Specifically, the Examiner will appreciate that "authentication", both in the art and in ordinary parlance, refers to verifying that something is what it claims to be. A server verifying that a proposed client is what it says it is can in no way be construed as the same as *checking whether the server itself has the capability to accept a new client.* The Examiner's allegation that Agarwal's column 10, lines 20 to 35 teaches "authentication" is thus contradicted by the immediately preceding lines (column 10, lines 17 to 19), which clearly describe that the example of denial of establishing a relationship is related to *the capacity of the server* in the proposed relationship. Therefore, not only are the passages of Agarwal referred to by the Examiner irrelevant to authentication of messages received from a remote router during a peering session, but these passages are irrelevant to the general concept of authentication.

of the router, messages received from a remote routing device during a **peering** session between the router and the remote routing device.

In light of the above, it is respectfully submitted that at least one element of claim 35 is neither taught nor suggested by Tsukakoshi and Agarwal, whether taken separately or in combination. Therefore, the Applicants respectfully submit that at least one criterion required for establishing a *prima facie* case of obviousness in accordance with MPEP 706.02(j) is not satisfied. The Examiner is thus respectfully requested to withdraw the rejection of claim 35, which is believed to be in condition for allowance.

III Rejection of Claims 38 and 41 under 35 USC 103

On pages 31 to 36 of the Final Office Action, the Examiner rejected claims 38 and 41 under 35 USC 103(a) as being unpatentable over U.S. Patent No. 6,577,634 to Tsukakoshi *et al.* (hereinafter referred to as "Tsukakoshi") in view of U.S. Patent No. 6,049,524 to Fukushima *et al.* (hereinafter referred to as "Fukushima") and U.S. Patent 7,003,582 to Basso *et al.* (hereinafter referred to as "Basso").

As described below, the Applicants respectfully traverse this rejection and submit that claims 38 and 41 are in condition for allowance.

Independent claim 38

Claim 38 is reproduced below with certain elements being emphasized:

> A router, comprising:
> a. an interface layer including a plurality of I/O controllers, each I/O controller implementing an I/O port;
> b. a switching layer in communication with said interface layer for selectively establishing signal pathways between said I/O ports;
> c. a routing layer in communication with said interface layer;
> d. each **I/O controller** implementing an **LSA entity**, said LSA entity including an **LS database**, said LSA entity being responsive to an LSA message from a remote routing device including LS information to:
> i. **update** said **LS database**; and
> ii. **forward** the **LS information** to said **routing layer**.

It is respectfully submitted that Tsukakoshi, Fukushima and Basso, whether taken separately or in combination, do not teach or suggest an I/O controller of an interface layer of a router that implements an LSA entity, where the LSA entity includes an LS database and is responsive to an LSA message from a remote routing device including LS information to:

- update the LS database; and
- forward the LS information to a routing layer of the router.

Firstly, as conceded by the Examiner on page 32 of the Final Office Action, Tsukakoshi fails to disclose these elements of claim 38.

To address this deficiency of Tsukakoshi, the Examiner applies Fukushima. However, as discussed below, Fukushima also fails to teach or suggest the above-mentioned elements of claim 38 that are missing from Tsukakoshi, and thus would not lead one ordinarily skilled in the art any closer to the router claimed in claim 38. Specifically, the Examiner's attention is directed to the following three (3) points:

1. While Fukushima indeed describes an LS database 22, this LS database 22 is clearly maintained in Fukushima's route calculation unit 11, i.e., in Fukushima's routing layer. Therefore, it is abundantly clear that the LS database 22 is not maintained in Fukushima's forwarding process units 13, i.e., it is not maintained in Fukushima's interface layer (column 5, lines 60 to 67; column 6, lines 1 to 4; and Figure 2).

2. The Examiner appears to contend, on page 33 of the Final Office Action, that the routing table 19 in each of Fukushima's forwarding process units 13 corresponds to a link state (LS) database. The Examiner's contention is incorrect for at least the following two reasons.

   Firstly, a link state database is an industry standard term that is distinct from a routing table, which is another industry standard term. This is evidenced by Fukushima itself that clearly differentiates between its link state database 22 and its routing table 19

(column 5, line 67 to column 6, line 3; column 6, lines 7 to 11; and Figure 2). As further evidence that a link state database is not a routing table (and vice versa), Fukushima itself explicitly states that "[its] routing table 19 is created from [its] link-state database 22" (emphasis added – column 6, lines 50 and 51).

Secondly, the content of a link state database is completely different from the content of a routing table. Specifically, a routing table does not contain information on the *state of links*, it contains information on *routes*. While a change in the state of a link can cause routes to be added or removed, the routing table only contains information on the resulting routes, not information on the state of the link that caused the change. Link states are not routes, and routes are not link states. This difference in content between a link state database and a routing table is clearly evidenced by Fukushima itself, which describes and shows in Figures 4 and 5 that the content of its link state database 22 is completely different from the content of its routing table 19 (column 4, lines 55 to 58 and column 6, lines 27 to 60).

The Examiner's apparent contention that the routing table 19 in each of Fukushima's forwarding process units 13 corresponds to a link state (LS) database is therefore incorrect.

3. The Examiner contends on pages 33 and 38 that it would have been "obvious to one ordinarily skilled in the art to move the Link State Database from the routing layer to the Forwarding (i.e. I/O Controller) layer by implementing it as a distributed database in order to prevent a single point of failure".

With respect, this contention is untenable since Fukushima's router already has backup databases in route calculation units of its routing layer and so there is already no single point of failure (column 7, lines 46 to 60)!

Thus, contrary to the Examiner's contention, it would not have been obvious to one ordinarily skilled in the art to move the link state database from the routing layer to

the forwarding layer in order to prevent a single point of failure, as there would be no motivation to do so in view of Fukushima.

For these reasons, it is apparent that Fukushima neither teaches nor suggests an I/O controller of a router's interface layer that implements an LSA entity including an LS database and having the updating and forwarding functionality claimed in claim 38.

With respect to Basso, this reference also fails to teach or suggest the above-mentioned features of claim 38 that are missing from Tsukakoshi and Fukushima. Specifically, each NP processor 12 of Basso's system supports a number of interface ports 20 and maintains a forwarding table 18 (column 2, lines 8 to 11 and 36 to 42). Basso in no way teaches or suggests an I/O controller of a router's interface layer that implements an LSA entity including an LS database and having the updating and forwarding functionality claimed in claim 38.

In light of the above, it is respectfully submitted that at least one element of claim 38 is neither taught nor suggested by Tsukakoshi, Fukushima and Basso, whether taken separately or in combination. Therefore, the Applicants respectfully submit that at least one criterion required for establishing a *prima facie* case of obviousness in accordance with MPEP 706.02(j) is not satisfied. The Examiner is thus respectfully requested to withdraw the rejection of claim 38, which is believed to be in condition for allowance.

Dependent claim 41

Claim 41 depends on claim 38 and therefore incorporates by reference all the elements of claim 38. Hence, for the same reasons as those set forth above in respect of claim 38, the Applicants respectfully submit that claim 41 is in condition for allowance and respectfully request the Examiner to withdraw the rejection of this claim.

IV Rejection of Claims 39 and 40 under 35 USC 103

On pages 36 and 37 of the Final Office Action, the Examiner rejected claims 39 and 40 under 35 USC 103(a) as being unpatentable over U.S. Patent No. 6,577,634 to Tsukakoshi *et al.* (hereinafter referred to as "Tsukakoshi") in view of U.S. Patent No. 6,049,524 to Fukushima *et al.* (hereinafter referred to as "Fukushima") and U.S. Patent 7,003,582 to Basso *et al.* (hereinafter referred to as "Basso"), and in further view of U.S. Patent No. 6,820,134 to Zinin *et al.* (hereinafter referred to as "Zinin").

As described below, the Applicants respectfully traverse this rejection and submit that claims 39 and 40 are in condition for allowance.

Dependent claims 39 and 40

Each of claims 39 and 40 depends on claim 38 and therefore incorporates by reference all the elements of claim 38.

As already shown in respect of claim 38, Tsukakoshi, Fukushima and Basso, whether taken separately or in combination, do not teach or suggest an I/O controller of an interface layer of a router that implements an LSA entity, where the LSA entity includes an LS database and is responsive to an LSA message from a remote routing device including LS information to:

- update the LS database; and
- forward the LS information to a routing layer of the router.

Furthermore, Zinin also fails to teach or suggest these elements of claim 38 (and thus of claims 39 and 40) that are missing from Tsukakoshi, Fukushima and Basso. Specifically, while Zinin describes a link state database 220, this link state database 220 is clearly not maintained in any of Zinin's network interfaces 210A to 210D, i.e., in Zinin's interface layer (column 6, lines 31 to 34 and Figure 2).

In light of the above, it is respectfully submitted that at least one element of each of claims 39 and 40 (by virtue of their dependency on claim 38) is neither taught nor suggested by the cited references, whether taken separately or in combination. Therefore, the Applicants respectfully submit that at least one criterion required for establishing a *prima facie* case of

obviousness in accordance with MPEP 706.02(j) is not satisfied. The Examiner is thus respectfully requested to withdraw the rejection of claims 39 and 40, which are believed to be in condition for allowance.

CONCLUSION

The Applicants are of the view that claims 1 to 30, 35, 38 to 41, 50 to 55 and 59 to 67 are in condition for allowance. Favorable reconsideration is requested. Early allowance of the present patent application is earnestly solicited.

If the present patent application is not considered to be in full condition for allowance, for any reason, the Applicants respectfully request the constructive assistance and suggestions of the Examiner in drafting one or more acceptable claims pursuant to MPEP 707.07(j) or in making constructive suggestions pursuant to MPEP 706.03 so that the application can be placed in allowable condition as soon as possible and without the need for further proceedings.

Respectfully submitted,

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Sanro Zlobec
Agent for the Applicants
Reg. No. 52,535

SMART & BIGGAR
1000 De La Gauchetière Street West
Suite 3300
Montreal, Quebec H3B 4W5
CANADA

Telephone: (514) 954-1500
Facsimile: (514) 954-1396